



**Embraer
Empresa Brasileira
de Aeronáutica S.A.**

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Supplier Qualification Report

Supplier: IMA Materialforschung und Anwendungstechnik GmbH
Address: Wilhelmine-Reichard-Ring 4
01109 Dresden – Germany
P.O. Box 80 01 44 – 01101 Dresden

Embraer's Quality Representative: Kilder Alves Gouveia

Supplier's Representative: Michael Roick

Period: 17th and 18th of November of 2014

Registered to ISO 17025: Yes No

Results:

Embraer recognizes IMA Dresden as approved supplier for material testing services.

In order to verify the supplier capability and expertise on materials testing, Embraer's Representatives done a technical visit to IMA Dresden facilities and evaluated all test related processes, including specimen preparation, dimensional inspection, instrumentation, testing execution, failure inspection and test reports.

This Approval is given after complete evaluation of test processes above and examination of all quality system, management system, equipment, technical staff and accreditations (i.e. NadCap).

List of Approved Test and Services

-Metallic materials – Mechanical, Metallographic and Corrosion Testing:

- Tension
- Compression
- Bending, Flexure
- Shear Tests
- High Cycle Fatigue
- Fatigue Crack Growth
- Fracture Toughness - K_{IC}, K_R Curve
- Impact Tests
- Drop Weight Test
- Stress Corrosion Cracking
- Stress Rupture
- Fasteners and Joints (tensile, fatigue and shear)
- Salt Spray
- Metallographic Analysis
- Chemical Analysis
- Hardness
- Conductivity
- Chemical Composition determination
- Specimen Preparation
- Specimen inspection
- Failure analysis

-Non-metallic materials / Composites –Mechanical Testing:

- Tensile Strength and Modulus
- Compression Strength and Modulus
- Combined Load Compression (CLC)
- In plane shear
- Interlaminar Shear (ILS)
- Interlaminar Tensile Strength
- Flexure (long beam, short beam)
- Impact (Drop Weight)
- Compression After Impact
- Tension After Impact
- Fatigue Test
- Fracture toughness (G_{IC}, G_{IIC}, Mixed-Mode-bending)
- Bearing
- Pull-through
- Open/Filled Hole, tension and compression
- Single and double lap shear
- Peel metal-metal
- Flatwise Tensile
- Plate Shear
- Stress-Strain
- Climbing Drum peel
- Specimen Conditioning
- Specimen Preparation (cutting, machining, tabbing)
- Laminates Manufacturing
- Specimen inspection and Failure analysis

-Non-metallic materials/Composites –Physical/Chemical Testing and Thermal Analysis:

- Fiber, Resin Volume Content
- Thermal analysis (DSC, DMA,Dilatometry Thermokinetic)
- Density
- Viscosity
- Micrographic, Image Analysis system

-Non-Destructive Testing

- Ultrasonic inspection (Immersion, Manual Pulse-Echo, C-Scan, Phased array, through transmission)
- Eddy Current
- Liquid Penetrant
- Magnetic Particle Inspection
- Thermography
- Knock testing

